

P E T I T I O N

1 Commissioner for Patents
Alexandria, VA 22313

Your Petitioner, SCOTT J. LONG, a citizen of the United States and resident of
the State of Nebraska, whose post office address is 302 Brooks Place, Bellevue,
5 Nebraska 68005, prays that Letters Patent may be granted to him for a

LEAK DETECTOR

as set forth in the following specification.

BACKGROUND OF THE INVENTION

10 The present invention relates to leak detection devices and more particularly to a
manual leak detector that is adaptable for use in detecting water connection leaks on
appliances having different wheel or support configurations.

DESCRIPTION OF THE PRIOR ART

15 The advent of icemaker and water taps for refrigerators greatly increased the
level of convenience in the kitchen. These systems are typically coupled to a water line
so that the system can function automatically. The water line is oftentimes connected
to the refrigerator at the lower end of its back side. Once the water line is connected,
the installer moves the refrigerator into its final position against the wall. Wheels or
20 other similar supports extend from the bottom of the refrigerator and help in moving the
refrigerator into and out of position for installation and maintenance. However, when
moving the refrigerator into position, it is common to pinch or otherwise damage the
water line connection at or near the point it enters the refrigerator. When this occurs,
25 water may slowly begin to leak from the water line connection unbeknownst to the

1 installer. The gradual leak continues until water has permeated the floor beneath the
refrigerator and the adjacent walls. Before the homeowner realizes that the leak has
occurred, thousands of dollars of damage can be caused. This situation can also occur
during the installation of many other appliances, such as clothes washers, dishwashers,
5 stand-alone icemakers, etc.

There is currently no industry standard or guidelines for the installer to follow for
checking for leaks from the water line connection after an appliance has been installed.
To be sure, the orientation of the appliance in most household settings does not provide
the installer with easy access to the rear panel of the appliance, where the water line
10 connection is typically located. It is also just as common that the position of the
appliance within custom cabinetry or its placement next to walls and built-in cabinetry
deny the installer easy access to either side of the appliance. Moving the appliance
back out of position to check the water line connection is not an easy task; but more
15 importantly, the installer risks damage to the floor coverings by moving the appliance
back and forth, not to mention the fact that the additional movement places further risk
of damage to the water line connection. Accordingly, installers are often left with the
only available option of hoping that they can look beneath the appliance with a flashlight
at different angles to see if any water has begun to leak from the connection. However,
20 as shown in Figures 3 and 4, the wheel placement may be different from appliance to
appliance. Moreover, the placement of the water line connection is typically at a
location that is behind one or more wheels. Accordingly, the installer is provided with
little opportunity to see the area immediately surrounding the water line connection.

1 Some prior art devices have been developed to sense the presence of moisture
in certain areas and emit an alarm. Certainly, such a system would work for detecting
water leaks from the water line connector of an appliance. However, such a system is
typically expensive and complex. Moreover, after the first couple of days, if a leak has
5 not occurred, one is not likely to occur unless the refrigerator is moved out of its final
position for maintenance and then moved back into position. Due to the infrequency of
moving refrigerators into and out of position, expensive and/or complex leak detection
systems are highly impractical.

10 Accordingly, what is needed is a relatively cheap and inexpensive leak detection
system that is easy to implement by an appliance installer or a homeowner.

SUMMARY OF THE INVENTION

15 The leak detection device of the present invention is generally provided with an
elongated handle and a head member disposed at one end of the handle. The handle
and head member have low profiles to permit them to be easily slid beneath an
appliance from its front side. The head member is provided with a testing arm that
preferably extends away from the long axis of the handle. Accordingly, the device can
be slid beneath the refrigerator until the testing arm has passed an obstacle, such as a
20 wheel, that is placed under the refrigerator in front of the water line connection. The
user then simply slides the device laterally to position the testing arm below the water
line connection. Once in position, the length of the handle can be trimmed so that the
handle does not protrude from beneath the appliance. This permits the unit to be left in
position for hours, days, or longer. After any duration of time, the individual simply

1 removes the device from beneath the refrigerator and checks the head member for
moisture.

5 The head member is also provided with an extension arm that moves the center
line of the head member away from the long axis of the handle. In this offset position, a
user is able to first move the testing arm around a wheel placed near the front of the
appliance and then slide the unit to the rear of the refrigerator, placing the testing arm
below the water line connection while avoiding the awkward positioning of wheels
positioned to the rear of the refrigerator. Alternate embodiments may include the
disposition of water soluble inks on the head member to enhance the visual evidence of
10 moisture on the head member.

It is therefore a principal object of the present invention to provide a leak
detection device that quickly and easily checks for leaks from the water line connection
of an appliance.

15 A further object of the present invention is to provide a leak detection device that
is adaptable for detecting leaks from appliances having various wheel/support
configurations.

20 Still another object of the present invention is to provide a leak detection device
that indicates the presence of leaks even if the fluid has subsequently evaporated.

Still another object of the present invention is to provide a leak detection device
that may be left in a leak detecting position indefinitely.

1 A further object of the present invention is to provide a leak detection device that
can be quickly and easily placed into a leak detection position and later removed for
storage at another location.

5 Yet another object of the present invention is to provide a leak detection device
that is reusable.

Still another object of the present invention is to provide a leak detection device
that is relatively simple and inexpensive to manufacture.

These and other objects will be apparent to those skilled in the art.

10 BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of one embodiment of the present invention as the
same could be used to detect a leak from a refrigerator;

Figure 2 is a perspective view of one embodiment of the leak detector of the
present invention;

15 Figure 3 depicts an embodiment of the leak detector of the present invention as
the same could be used to detect a leak from a water supply line of an appliance having
a particular configuration of refrigerator supports;

Figure 4 depicts the leak detector of Figure 3 as the same could be used to
detect a leak from a water supply line of an appliance having an alternate configuration
20 of refrigerator supports; and

Figure 5 is a perspective view of an alternate embodiment of the leak detector of
the present invention as the same could be used to detect a leak from a clothes
washer.

DESCRIPTION OF THE PREFERRED EMBODIMENT

1 The leak detecting device 10 of the present invention is generally depicted in
Figures 1-4 as having a handle 12 and a head member 14. The handle 12 is preferably
elongated, having a first end portion 16 and a second end portion 18. The head
5 member 14 is provided with a rearward end portion 20 and a forward end portion 22.
The rearward end portion 20 of the head member 14 is secured to the second end
portion 18 of the handle 12.

 Together, the handle 12 and the head member 14 are shaped to have a thin
profile. This permits the device 10 to be easily slid beneath an appliance, such as the
10 refrigerator 24, which is supported above the floor by a plurality of wheels 26. Typically,
the appliance is provided with a pair of wheels 26, or other similar type of support, such
as a glide or foot peg, adjacent the front side 28 of the appliance. An additional pair of
wheels 26 or similar type of support is typically positioned adjacent the back side 30 of
15 the appliance. However, the wheels 26 adjacent the back side 30 are typically
positioned in one of two different arrangements in most appliances. The wheels 26
may be positioned adjacent the corners of the appliance, as depicted in Figure 4, or the
rear wheels 26 may be moved inwardly, as depicted in Figure 3. A fluid connection line
20 32 extends from the back side 30 of the appliance and is typically positioned closely
adjacent one of the lower corners of the back side 30.

 In order to test for a fluid leak from the fluid connection 32, without first moving
the appliance from its position adjacent the wall, it is important to be able to get the
head member 14 below the fluid connection 32. The positioning of the wheels 26
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1 creates a challenge in attaining this goal, since an object cannot be simply slid straight
from the front side 28 to the back side 30 of the appliance to position the head member
14 below the fluid connection 32, as shown in Figures 3 and 4. Accordingly, the head
member 14 is preferably shaped to have a testing arm 34 that extends away from the
5 long axis 36 of the handle 12. Although the testing arm 34 is depicted in Figure 2 as
extending generally perpendicular to the long axis 36 of the handle 12, it is
contemplated that the testing arm 34 could extend at angles greater to or less than 90°
with respect to the long axis 36. It is further contemplated that the testing arm 34 could
extend outwardly from the long axis 36 in a generally arcing direction. Moreover,
10 although the testing arm 34 is generally depicted in Figure 2 as being formed in the
forward end portion 22 of the head member 14, it is generally contemplated that the
entire head member 14 could be shaped as a single testing arm 34. Extending the
testing arm 34 outwardly from the long axis 36 of the handle 12 permits the user to
15 simply slide the device 10 from the front side 28 of the appliance to the back side 30
and then simply slide the device 10 laterally until the testing arm 34 is positioned below
the fluid connection 32, as shown in Figures 3 and 4.

The embodiment of the head member 14 depicted in Figure 2 is provided with an
20 extending arm 38, which like the testing arm 34 extends outwardly from the long axis 36
of the handle 12. Similarly, the extending arm 38 could extend perpendicularly to the
long axis 36, and it could also be shaped to extend at any different angle or arcuate
direction therefrom. The head member 14 depicted in Figure 2 is also provided with a
lengthening arm 40, which extends between the testing arm 34 and the extending arm
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1 38. Although the lengthening arm 40 is depicted as being positioned generally parallel
to the long axis 36 of the handle 12, it is contemplated that the lengthening arm 40
could be disposed at any angle with respect to the long axis 36. Together, the
extending arm 38 and the lengthening arm 40 serve to position the testing arm
5 forwardly and laterally of the second end 18 of the handle 12.

The testing arm 34 and lengthening arm 40 are preferably positioned with
respect to one another so that when the lengthening arm is positioned adjacent the side
of a wheel 26, as depicted in Figure 4, the testing arm 34 is disposed to the rear of the
wheel 26. This permits the testing arm 34 to "reach around" the wheel 26. The
10 extending arm 38 and lengthening arm 40 are preferably positioned with respect to one
another such that when the lengthening arm is positioned along one side of the wheel
26, the extending arm 38 is positioned in front of and along the width of the wheel 26.
A combination of these arm positions permits the user to avoid the wheels 26 when
15 they are disposed in the configuration depicted in Figure 3. First, the user positions the
testing arm 34 so that it is behind the wheel 26 adjacent the front side 28 of the
appliance. This permits the device 10 to be slid straight back to the back side 30. The
orientation of the extending arm 38 positions the lengthening arm 40 a sufficient
20 distance from the wheel 26 adjacent the back side 30. The length of the lengthening
arm 40 may be provided such that the testing arm would be properly disposed below
the fluid connection 32 despite the fact that the positioning of the wheel 26 would not
permit the extending arm 38 to advance further to the rear of the appliance.

1 The head member 14 generally has a first upper surface 42 and a second lower
surface 44. It is these surfaces which will receive any fluid escaping from the fluid
connection 32. Accordingly, it is contemplated that where the head member 14 is
shaped in a manner described hereinabove, it is contemplated that the opposite sides
5 will provide shapes that mirror each other for use in testing a fluid connection 32
located at either side of the back side 30 of an appliance as depicted in Figures 3 and
4. It is contemplated that the head member could formed from nearly any material,
such as plastic, wood, metal or paper. However, it is preferred that the head member
be formed from a heavy paper stock such as cardboard, for its ease in manufacture
10 and shaping as well as its low cost. Moreover, such a material provides a level of fluid
absorbency that will assist the user when a fluid leak is intermittent. In such a case, the
leak may continue for awhile, while water is accepted by the appliance. However, the
leak may temporarily stop, allowing moisture to evaporate. Accordingly, where the
15 head member is made from a fluid-absorbing material, the fluid will tend to evaporate
more slowly. Moreover, the evaporated fluid will typically leave behind evidence that
the material was once wet, such as a water line and a slight disfiguration to the texture
of the surface. It is further contemplated that a water soluble ink could be disposed on
one or both of the surfaces 42 and 44 so that additional or enhanced visual evidence of
20 a leak could be provided in the form of splotched ink on the head member 14.

It is contemplated that the device 10 could be used for a few days to determine
the integrity of a fluid connection and then discarded. However, it is also contemplated
that the device 10 could be left in position adjacent the fluid connection 32 indefinitely.

1 In this instance, it is preferred that the handle 12 be formed of a material, such as
heavy paper stock, wood or plastic. Each of these materials are easily trimmed to
provide a handle 12 having a length that does not pass the front side 28 of the
appliance when the device 10 is in position. This leaves the device out of sight but
5 retains its position to be checked periodically for potentially damaging fluid leaks. This
also permits the device 10 to be reused where a leak is first detected. In that instance,
the device 10 is simply dried and returned to its position adjacent the repaired fluid
connection 32. The device 10 could also be taken by an appliance installer from one
job to the next.

10 Figure 5 depicts an alternate embodiment device 10', which could be used with
appliances such as a clothes washer that may have a standard configuration (Figure 4)
but may have a fluid connection extending from the upper end portion of the back side
of the appliance. The device 10' is provided with a handle 12' and a head member 14'
15 that function much in the same manner as those on the device 10 described previously.
However, a standard support configuration on the appliance depicted permits the
testing arm 34' to be longer and extend beyond both sides of the handle 12'. The
device 10' is preferably positioned between the appliance and the operating surface
adjacent the wall. In this position, a fluid leak from a fluid connection anywhere on the
20 back side of the appliance will come into contact with the testing arm 34'.

In the drawings and in the specification, there have been set forth preferred
embodiments of the invention; and although specific items are employed, these are
used in a generic and descriptive sense only and not for purposes of limitation.

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Changes in the form and proportion of parts, as well as substitution of equivalents, are contemplated as circumstances may suggest or render expedient without departing from the spirit or scope of the invention as further defined in the following claims.

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Thus it can be seen that the invention accomplishes at least all of its stated objectives.

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